

MOSES, (I.)

II. Military Surgery and Operations following the Battle of Rivas, Nicaragua, April, 1856. By I. Moses, M.D., late Surgeon-General of the Nicaraguan Army. - - - - - 21

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ART. II.—*Military Surgery and Operations following the Battle of Rivas, Nicaragua, April, 1856.* By I. MOSES, M. D., late Surgeon-General of the Nicaraguan Army.

AN interesting addition to the records of military surgery has been but recently made on our own continent, and in a country to which the eyes of all nations, and especially of Americans, have been turned with eager interest.

The States of Central America, occupying the isthmus between Mexico and the republics of South America, have within the last few years, since the establishment of our immense national interests on the Pacific, attracted the attention of the world. Through them has rushed a tide of population, from the east towards the west, unequalled in the annals of history; which has founded, in the short period of eight years, a State with cities rivalling, in beauty, wealth, and architectural adornment, our oldest Atlantic towns; opened a market for the commerce of the world; and sent back over this same isthmus, in return, not less than three hundred millions of money. Yet, during the same period, this great highway of nations, peopled by a degenerate mongrel race, torn by civil wars and sunken in barbarism and superstition, has hardly felt the influence which has given an impetus to the whole civilized world.

Little over a year since, a new element was introduced into the army of the democratic party of Nicaragua, which rapidly gave it the ascendancy. Invited by the new government to take charge of the medical department of the army, now composed of native and American troops, I arrived at Granada, Nicaragua, in February last, and was honoured with the commission of Surgeon-General. No cases of surgical interest occurred until after the battle of Rivas, which was fought on the 11th of April, and lasted about fourteen hours. Small arms were only used—muskets, rifles, and revolvers on the one side, and Minié muskets on the other. A small piece of artillery was taken from the enemy early in the morning, which had been discharged but once; but no wound appeared to have been made by grape and canister, with which it was loaded. The action on both sides was of a desultory character; brisk at first; repelling charges, and sharp shooting from loop-holes. After a forced march of about seventy or eighty miles, with irregular and sparse rations, an annoying fight, without food for thirty hours, it was deemed advisable by the general to retreat, which was safely effected at 2 o'clock next morning. The wounded received their primary dressing during the engagement, and were made tolerably comfortable in a safe place. From the fact of no artillery being used, none of those terrible wounds were received requiring operative interference during the day. About sunset the wounded, amounting to fifty-five, though many of a trivial nature, were removed to the church for safety; and, on the retreat, those who could not walk

were mounted on mules and horses. Some five or six, who could not possibly be removed, were abandoned, and next day bayoneted by the enemy. No litters were on hand, in consequence of the rapidity of our movements and want of means of transportation, and the roads do not admit of the passage of light wagons or ambulances. The wounded did well, and were again dressed and made comfortable at Irandime, thirty-six hours after the battle. They arrived at Granada on the evening of the fourteenth, and were placed in hospital.

In the encounter there were about four hundred and twenty Americans, with one hundred and sixty natives, in the Nicaraguan army, opposed to nearly three thousand Costa Ricans. The official returns reported on our side were: killed and missing, sixty-one, of whom many subsequently reported themselves; wounded, fifty-five, of whom five or six were unable to be removed, and forty-six were sufficiently severe to require surgical attendance. Of these there were twelve officers, and thirty-four non-commissioned officers, privates, and citizen volunteers.

There were wounds of the head and neck	10
“ “ “ arms and hands	12
“ “ “ chest	7
“ “ “ thigh and leg	17
Total	46

Of which twelve required operative proceedings, viz:—

Exsection of balls	6
Amputation of forearm	4
“ “ arm	1
Ligation of left subclavian artery	1
Total	12

As several of the above cases present points interesting to the military surgeon, I propose giving a short outline of some of the more important.

CASE I.—Lieut. Potter received a Minié ball about the middle of the left arm, fracturing the humerus and coursing towards the shoulder, from which I extracted it after our arrival at Granada. Wishing to save the arm, and no bad symptoms appearing, it was placed on a pillow for a week. Considerable swelling of the entire limb supervened, with general irritability and discharge of unhealthy looking pus, and amputation was proposed as giving him the best chance. On the morning of the 26th, a fortnight after the receipt of the wound, febrile symptoms of an active character set in, and yellow fever developed itself, with coma, low muttering delirium, refusal to take medicine or nourishment, and black vomit, which terminated the case in a few hours.

Fevers of a malarial character were prevalent, and yellow fever, in the form of a mild epidemic, existed. Unfortunately, the wounded were placed in the same hospital with the fever cases; but most perfect ventilation, abundant accommodations, and strict police existed. I regretted not having amputated

the arm. The bone was comminuted, the soft parts lacerated and contused, but no nerves nor bloodvessels injured. Experience had taught me, and this case has confirmed me in my previous opinion, that in gunshot wounds in which the bone or bones are fractured and comminuted, as is especially the case where the projectile is from the Minié arm, whether rifle or musket, amputation should be resorted to.

CASE II.—Maj. Markham, during a charge, was struck by a ball on the inside, and a little above the patella, so as to involve the cavity of the knee-joint, and the synovial fluid was oozing out when I saw him, very shortly after. He rode on horseback during the retreat, but complained of a sense of weight and stiffness more than pain. On arrival at Granada, he was comfortably placed in private quarters; the most absolute rest and abstemiousness were enjoined, and cold dressings applied. He recovered entirely, without any particular inflammation of the joint, and with free motion. His happy recovery may be attributed to his strict observance of rest, an almost starving diet, and his excellent condition for bearing wounds, being a thin, wiry person, of placid temper and gay disposition.

CASE III.—Capt. Casey, in the same charge, received a Minié musket-ball through the left wrist, shattering the lower portion of the radius and carpal bones. His wound was dressed, his arm placed in a sling, and he arrived at Granada comfortably, where I amputated at the middle of the forearm. Four days after, he was walking about, and the stump healed most kindly.

CASE IV.—Capt. Cook, Quartermaster, wounded in the same charge, the ball entering the left shoulder in front, inside of and below the acromial articulation of the clavicle, taking a course downward, backward, and inward, and was felt just below the inferior angle of the scapula, whence I extracted it the day after our arrival at Granada (14th). He rode, without much inconvenience, on horseback from Rivas, and was comfortably quartered in the house of a native family, from whom he received every care and attention. Of a nervous and irritable temperament, it was impossible to keep him quiet during the day or night; he insisted upon sitting up and walking about the room, although he was repeatedly warned of his extreme danger. He continued to do well, however, until the morning of the 21st, when, while sitting up in a chair to be dressed, violent hemorrhage took place, and he lost a large quantity of blood before it was checked; and, on my arrival, I found him very feeble. Believing that the slough in the course of the ball had made an opening into the axillary artery just after its passage out of the chest, I informed the patient that his only hope was ligation of the artery, to which he readily assented, and I immediately ligated the subclavian at the middle, or very near the first space, it being necessary to apply pressure over the first rib. No hemorrhage recurred, but he soon began to sink, became delirious and restless, his respiration very slow and laboured, and he died at 4 P. M. of the 24th, about *seventy-nine* hours after the operation.

Twenty-four hours previously to death, the shoulder and arm became livid and oedematous. He was fed with stimulants, but, deglutition being difficult, and no prospect of recovery, he was made as comfortable as possible until the final issue.

I regret that circumstances did not permit an examination of the parts.

CASE V.—Adjutant Britman, 2d Rifles, received a Minié musket ball in the left arm, in the upper third, while firing his piece; the ball passing behind the shoulder, along the ribs, and through the scapula, lodging near the inferior angle, from which I removed it after our arrival in Granada. His symptoms promised a good recovery for forty-eight hours, when tetanus set in, with severe spasm of the muscles of the face and trunk, and he sunk twenty-four hours after. He had ridden from Rivas without inconvenience; his wounds looked well; no vessels or nerves were involved, and his habits and health had always been good. Brandy, assafoetida, and opium in large doses were administered, but without effect.

CASE VI.—Lt. Jones received a ball in the left hip, which entered below the trochanter, and buried itself deeply in the fleshy part of the nates, where it could not be detected by a probe. He was able to move his thigh perfectly, and without pain; he slept well, and was in good condition until the 23d, when the fever, which was prevalent, set in, assumed a typhoid character, and he died on the evening of the 25th with delirium. He was in a separate apartment, surrounded with every care and attention, and fell a victim to the epidemic, which has carried off many a brave man in this city.

CASE VII.—Capt. Armstrong received a ball on the outside of the right leg, which passed through the leg, and lodged beneath the integuments on the inside, from which I removed it ten days after the battle. Wound did well, and rapidly healed.

CASE VIII.—Sergt. Sarsfield received a wound in the throat, the ball entering just above the articulation of the left clavicle with the sternum, passing directly backward, wounding the trachea and œsophagus, and lodging in the anterior muscles of the spine. He rode on horseback from Rivas to Granada, and was perfectly comfortable, and surrounded by the most assiduous attentions from a native family. The wound was of the size of a dime, through which liquids flowed when he drank, a part only passing into the stomach, mixed with the air as he respired. His voice was a mere whisper. So severe a wound in so important a region called for the most unremitting watchfulness, which he received. The most absolute repose was enjoined, and the most simple articles of diet. The wound progressed well; the slough separated, and there was a discharge of healthy pus, the aperture becoming large but granulating. Cough was the only annoying symptom.

May 3. Up to the present date he has continued to do well; his strength is much diminished in consequence of his strict diet. Contraction has taken place in the œsophagus, and less fluid passes through it. For the last few days he has been supported by enemata of beef-soup, sago with wine, and baths of aquadiente. His cough has been quite troublesome, for which anodynes were given. Hemorrhage, which has been most anxiously feared, began this morning, darkening the ray of hope which I had of his recovery, not a bad symptom having arisen until this morning, the *twenty-third* day. No operative interference could be resorted to, and we could only apply some compressed sponge.

6th. Hemorrhage has continued from time to time through the wound, from the nose, and spread beneath the coverings of the neck. Last night he became delirious, and died to-day at 5 P. M.

CASE IX.—Finney, citizen volunteer, received a ball in the left shoulder, which lodged beneath the pectoral muscle below the clavicle, from which I

removed it three weeks after the battle. The ball was of iron, and of very large size. He recovered rapidly.

CASE X.—Capt. McArdle, while serving a piece of artillery taken from the enemy, was struck by a musket ball in the left forearm, producing considerable destruction of the tendinous tissues, and comminuting the ulna near the joint. Although the wound called for immediate amputation, he was so unwilling that the operation was postponed, and no untoward symptom occurred until the thirteenth day, when suddenly violent arterial hemorrhage came on, and the arm was immediately amputated about the middle, where the bifurcation of the brachial artery was found. The stump did admirably, and in a few days he was up and about.

CASE XI.—McPall, of the Rangers, received a shot, the ball striking the inferior maxilla on the right side, fracturing the bone, and passing obliquely through the neck, and out posteriorly on the left side about an inch from the spines of the vertebræ, without any evidence of serious injury to the internal parts. He slept well, eat well, and walked about for ten days, when suddenly, while sitting at the window, profuse hemorrhage came on, and blood in large quantities was poured from the mouth and into the lungs, and in five minutes he was dead.

It is difficult to understand how a ball should have taken such a course without tearing vessels, nerves, and organs essential to deglutition and respiration, yet so capriciously do they turn aside and alter their position when they have lost momentum, that we may explain in this case the total absence of serious injury until within a few minutes of the fatal termination of the case. I saw the patient certainly within three minutes of his attack, when pressure was made upon the common carotid, the internal being no doubt the source of the hemorrhage, hoping to moderate the flow and enable me to ligate the vessel; but death was too rapid for surgical art to avail.

CASE XII.—Private Hutchins, while in the act of firing, received a Minié ball, which passed through the left wrist and under the right arm, tearing the soft parts very much, and making a very ragged wound. Under simple dressings both wounds did well, that in the right axilla healing almost completely; but on the fourteenth day after the battle the wrist became very painful, with general constitutional irritability and febrile symptoms; the wound looked foul, and the hand white and pasty.

On consultation it was determined to amputate, and I took off the forearm at the junction of the upper and middle third. Next day he was quiet; had rested well; the febrile movement less marked, and expressing himself very comfortable, and rejoiced to get rid of the hand.

May 2. Is now doing very well, and stump healing.

10th. In consequence of some imprudence, fever again appeared, but not of an alarming character, but on the 8th he was reported to me as being worse, and on visiting him with the medical officer in whose charge he was, I found delirium, subsultus tendinum, and great prostration of the nervous energy, and he died delirious the same night.

On examination of the parts, the flaps were adherent throughout, the bone rounded off, and the stump in fine condition.

CASE XIII.—Private Lott received a glancing shot sideways, which fractured the lower jaw of the right side an inch and a half anterior to the angle, and tore the soft parts, leaving a large ragged wound. When the wound had nearly healed he was attacked with yellow fever, and died with *black vomit*.

CASE XIV.—Sergt. Pittman was struck by a Minié ball in the upper third of the left arm, comminuting the bone, which was followed by effusion, which in a few days produced great pain, general constitutional disturbance, and a disposition to great nervous prostration. He rode on horseback from Rivas, and the day after our arrival, the symptoms not promising more favourably, I amputated high up. He passed that night and next day more comfortably, and recovered with a good stump.

CASE XV.—Sergt. Dunnigan was struck by a ball sideways, which cut away in a very clean manner, half an inch in width, the soft tissues opposite the crico-thyroid articulation, but not wounding the larynx. He immediately lost his voice, not being able to articulate louder than in a whisper, and had some difficulty in respiration. He could not swallow solid food for some days, but all the parts healed kindly, and recovery was perfect.

In connection with the above, I would note a case of gunshot wound of the larynx occurring in 1849, showing how much destruction and injury may be done to these parts, and recovery follow. While crossing the plains near Fort Boisé, a corporal of H Co. Rifles was accidentally shot by a fellow soldier at not more than forty yards distance with a conical ball, which tore away the soft parts extensively, fractured the os hyoides, thyroid, and cricoid cartilages, and opening a large hiatus in the laryngeal cavity. The distressing dyspnoea, and other urgent symptoms, induced me to declare the wound mortal, but as we were on march, a canvas tent fly was stretched in a wagon, so as to make him as comfortable as possible. The wound was cleansed, spicula of bone removed, the parts replaced and adapted as well as could be, and cold water applied. Being unable to swallow, his mouth was moistened with water; a hospital steward placed in the wagon to attend to his wants, and we proceeded on our journey. He did not particularly complain during the march, except of heat and dust, and to my surprise I found him in good spirits and hopeful when we halted for the night. It will be sufficient to say that he finally recovered at Oregon City, with an opening in the larynx, and entire loss of voice. He made the journey of about four hundred miles in a wagon, over a dusty road for the most part; but great care was given to the examination and dressing of the wound. Unfavourable symptoms, presenting two or three times during his recovery, were promptly and successfully met. It has been my fortune to have seen several most interesting wounds, and injuries about the throat and vocal apparatus, and, except where the large bloodvessels were involved, they have all done well.

CASE XVI.—Private Mayer was struck by a small rifle ball in front of the ear, which passed through the cartilages, and lodged behind the mastoid process, from which I removed it a few minutes after he was wounded; applied a light bandage, and he continued fighting during the day.

CASE XVII.—Captain Bradly received a small wound just beneath the angle of the jaw on the left side, and applied to have some foreign body removed. On examination, a small piece of metal was found and removed, which proved to be a portion of a small bell. It appears that while in the church, near the altar, a ball struck one of the ornaments, sending the fragments in all directions, one of which had buried itself in his neck.

Of the forty-six cases of which I have notes, there are many of great interest to the military surgeon, showing the course of balls; the wonderful escape of large vessels and nerves; the extent of the reparative process, and how often the severest wounds get well, while the most trifling are the cause of sudden death. Yet, I do not propose, at the present time, to relate them. The hospital, in which the wounded were placed on our arrival in Granada, was a large house, used for governmental purposes, near the Spanish régime, having, inside and outside, along the corridors, sufficient space; it was well ventilated, and kept in good police. The beds were such as are used in the country, with a hide firmly stretched between the side pieces, rather hard to those accustomed to the luxury of mattresses or feather beds, but admirably adapted to warm climates. Bedsacks filled with dry soft grass and good bedding were furnished to the majority, making them very comfortable. It was greatly to be regretted that the wounded were obliged to occupy the same building with fever cases; but, as soon as circumstances permitted, a separate and distinct house was procured as a fever hospital, to which they were removed; the first hospital being whitewashed, cleaned, and occupied solely by surgical cases. All this, however, could not be effected before there were victims.

Death occurred from secondary hemorrhages in 3 cases.

"	"	"	tetanus	" 1 case.
"	"	"	fever	" 4 cases.

Among the last, Hutchins, whose hand had been amputated, being the only death among those operated on.

Notwithstanding many depressing circumstances, hot climate and inappropriate hospital diet, no wounds could more rapidly and happily have got well.

From the earliest dressing, cold water was used universally by the officers of the staff who devoted themselves night and day to the care of the wounded, who were never left without one ready in case of accidental symptoms. Yet here, I regret to say, as in other services, no acknowledgment was ever made to those who shared the same dangers in the field with those rewarded by military honours, and whose most toilsome duties were continued for weeks after, while their companions were resting on their newly acquired rank.

I have ever been opposed to the use of poultices as uncertain and offensive applications. To be of use, they should be at least half an inch thick, and changed every three hours. This is often wearisome to the patient, requires the movement of a limb or part which should be kept quiet, and produces an irritability and dread on the part of the patient. It is frequently impossible

to prevent the bed from being soiled by the poultice slipping. All this may be avoided by water-dressings; if cold be most grateful, by a folded linen cloth dipped in water and laid loosely over the part, or kept moist and cool by a drip from a vessel suspended above; if warm be preferred, by covering the wet cloth with oil silk, it soon acquires the temperature of the part and becomes a light and elegant poultice. Various medicinal agents may be thus applied of a sedative or stimulating character.

This dressing is the more applicable in tropical regions, where it is desirable to keep the wounded cool and clean. The months of April and May, in Granada, are the warmest of the summer season, being at the end of the dry period. The climate of Granada is warm throughout the year; the nights pleasant enough for refreshing sleep.

Observations made with the barometer and thermometer during the month of April, showed as follows:—

		7 A. M.	2 P. M.	9 P. M.
Monthly mean.	Barometer . . .	29.89	29.85	29.90
	Attached thermometer .	80.9	91.7	83.
	Thermometer in open air .	80.4	91.1	82.6

The air mostly dry; no rain falling; the sky clear; the wind light and constant from the east. This wind prevailed during nearly six months of the year, and blowing over an extensive swampy region lying to the N. E. of the city, is the source of the malarial fevers which prevail during the summer and autumnal months. During the rainy season, which is perfectly delightful, the prevailing wind is from the W. and S. W.; the rain falling in short and heavy showers in the afternoon and night, often accompanied by heavy thunder and vivid lightnings. It is during these months, from June to November, that Nature adorns the land with her garb of most luxuriant foliage, when the fields of corn and sugar-cane wave most gracefully in the breezes, laden with rich perfume from the orange and gorgeous flowering productions of the land. To enjoy nature in perfection, to realize our sweetest fancies, it is necessary to dwell in the tropics, where trees never know the age of the "sere and yellow leaf," and the fields ever retain their brilliant verdure; where cloudy skies and chilling winds are never felt; where a glowing sun, bright blue sky, and a luxuriant and varied foliage ever smile. Such is the climate of Nicaragua, varying in its different parts to suit the cooler fancies and more material tastes of business men. The city of Granada, on the border of the lake of Nicaragua, is the only unhealthy locality in the State, arising from the causes above related, but comparing favourable with most of our Southern cities. But it is not my intention, at present, to enter in a detail of the climatology and productions of the State.

Gunshot wounds, so rarely presented to the surgeon in civil practice, afford the army surgeon a specialty of great interest, especially when occurring in numbers, where he himself is a witness of them, and has them under his special notice from the time of infliction to their termination in recovery or death.

The miraculous relations of old writers as to effect of windage, spent balls, &c., has been long proved to be fabulous in many of their details, while the introduction of new and more destructive weapons offer a newer and more interesting field of observation, and a class of injuries rarely or never seen, except after a battle.

The introduction of the Minié musket and rifle has created an almost entirely new class of gunshot wounds, remarkable for the distance at which they strike; the great destruction of soft parts; the complete comminution of the bones struck; the greater tendency to secondary hemorrhage, and greater urgency for amputations. Following such wounds is a greater amount of constitutional disturbance; higher degree of inflammatory action; more profuse purulent discharge, and a much more protracted period of recovery; calling on the surgeon for a more patient and devoted attention to his cases and the exercise of a careful and experienced judgment in his proceedings. This class hold an intermediate place between the ordinary wounds of small arms and those produced by artillery, and a full knowledge of both must guide the surgeon in the middle course.

The weight of opinion among British and French Army Surgeons is in favour of immediate or primary operations in all cases requiring surgical interference; but regard must be had to the circumstances in each particular contingency; to the convenience of place, and, to some extent, the anticipated result of the battle during which the wounds are inflicted; but this subject has been so ably discussed by those far more experienced and capable than myself, I do not offer even a concurring assent. Conservative surgery has taught us so much, however, during the last few years as to the power of saving whole limbs by the exsection of joints, that we may, under the most favourable circumstances, preserve for our patients important members which our teachers, not long since, would have condemned to the knife. To the records of the late European campaign, and the experience arising from so vast and instructive a school, we most respectfully look for our most instructive lessons.

In a subsequent paper, I propose to give a short account of the topography and climatology of the State, and the prevailing diseases among strangers and the native population, and the influence of *tropical climates generally* upon Europeans. Long since, I had doubts of what is termed "acclimation;" but personal experience, confirmed by that of several highly intelligent medical men, has taught me that it is rare. Individuals may accommodate themselves to the habits of a people, and even enjoy a good degree of health; but, both physically and mentally, they degenerate.

The active and exposed duties of the soldier, however, rapidly tell upon his effectiveness. I have seen troops in Texas, where military service has been severe, exercise on scouts and guard, under the influence of a tropical heat, actually wilt down, and for months remain feeble, pallid, and dejected. Such, too, has been the experience of the army surgeons in Florida. To keep

troops for a series of years in such a climate, with the idea that they will become inured and insusceptible to its influences, is an egregious fallacy. The same remarks apply equally to females and children, inducing, among the first, obstinate forms of uterine and vaginal diseases; and, in the latter, convulsions, diseases of the stomach and bowels, and even paralytic affections.

But, with these preliminary remarks, which are made rather to suggest thought upon the subject among those having opportunity of observation, I will close my paper, trusting to a more able pen for further teaching upon so interesting a topic.

NEW YORK, September, 1856.

ART. III.—*Case of Exostosis occupying the Orbit and Nasal Cavity, successfully removed, and Vision restored.* By ALEXANDER B. MOTT, M. D., Surgeon to "St. Vincent's Hospital," and the "Jews' Hospital in New York," &c. &c. (With a Plate.)

TUMOURS in the orbit, combined with exostosis, have long been familiar to every surgeon of experience. Sir Astley Cooper, in his *Surgical Essays* (part i. p. 157), in the earlier part of the century excited considerable attention by the narrative of one which proved fatal in consequence of making its way through the orbitar process of the os frontis to the brain; and Mr. Guthrie, the celebrated English military surgeon who has lately been removed from the world of science, records others which especially attracted his notice. One of these, however, was on a very small scale, not exceeding in dimension the size of a large marble, a point at which it seems to have remained stationary; while a second, of larger growth, effectually resisted the application of the actual cautery, which seems to have been the only mode of treatment that suggested itself to the practitioner. On the continent of Europe we find numerous cases detailed by Brassant, Langenbeck and others in the various scientific journals of France and Germany, all of which were accompanied by more or less displacement of the eye. But I am not aware of any so extensive as that which fell under my observation in the following instance; and though Mr. Guthrie, on finding the cautery fail, afterwards proposed the use of the saw and chisel, I believe my operation will be found original.

The patient, William Hoy, aged thirty-three, a native of Edinburgh, Scotland, and a wood-turner by trade, had about seven years previous to his applying to me for advice, noticed an enlargement towards the inner canthus of the left eye. His previous health had been good, though he had been subject to headache, and his attention was first drawn to the seat of disease by inflammation around the part, and a troublesome flow of tears over the cheek. About eighteen months after he first noticed the tumour, the left

